



Zero Carbon Power

Mark Hartney
Program Director

Introduction

Mark Hartney

Codexis

James Lalonde

GE

Robert Perry

FloDesign

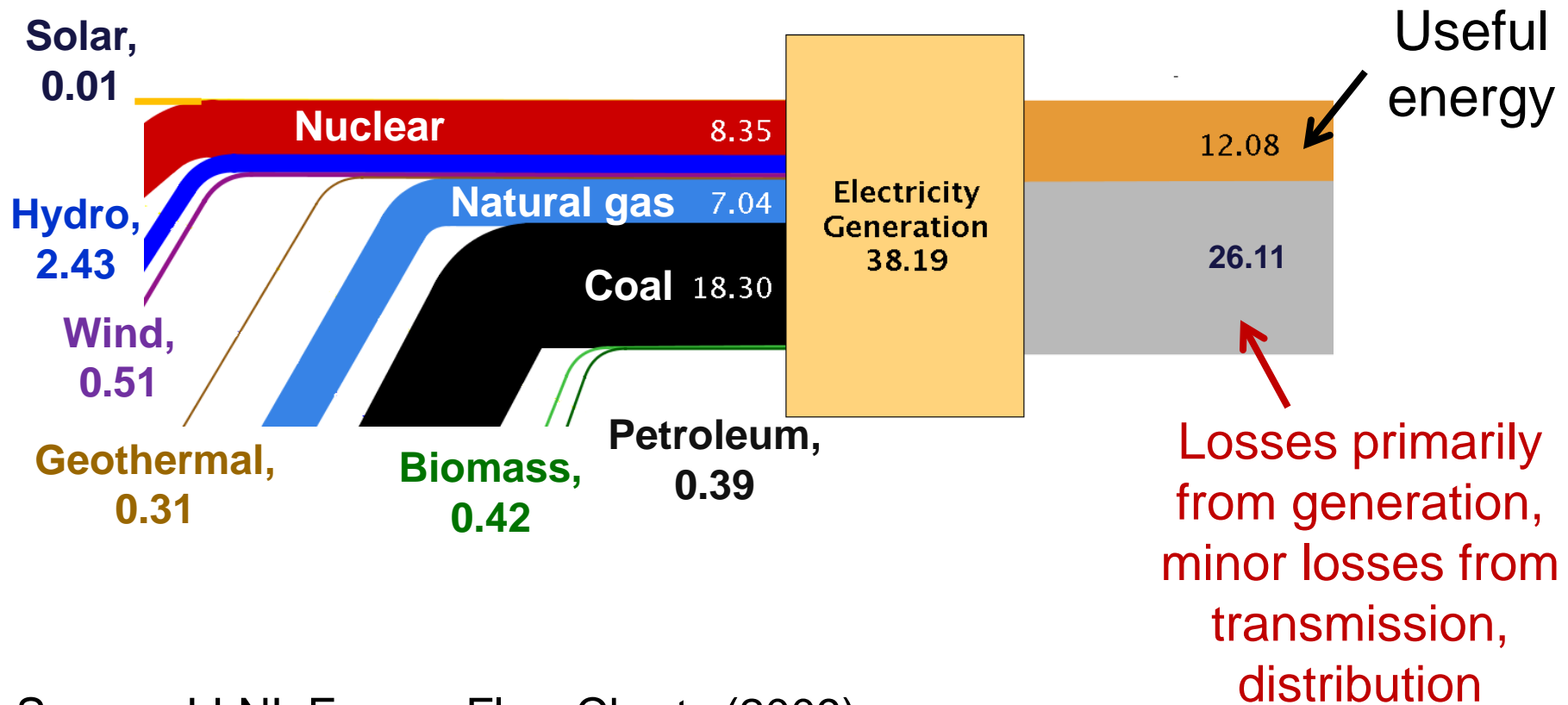
Matthew Commons

Makani

Corwin Hardham

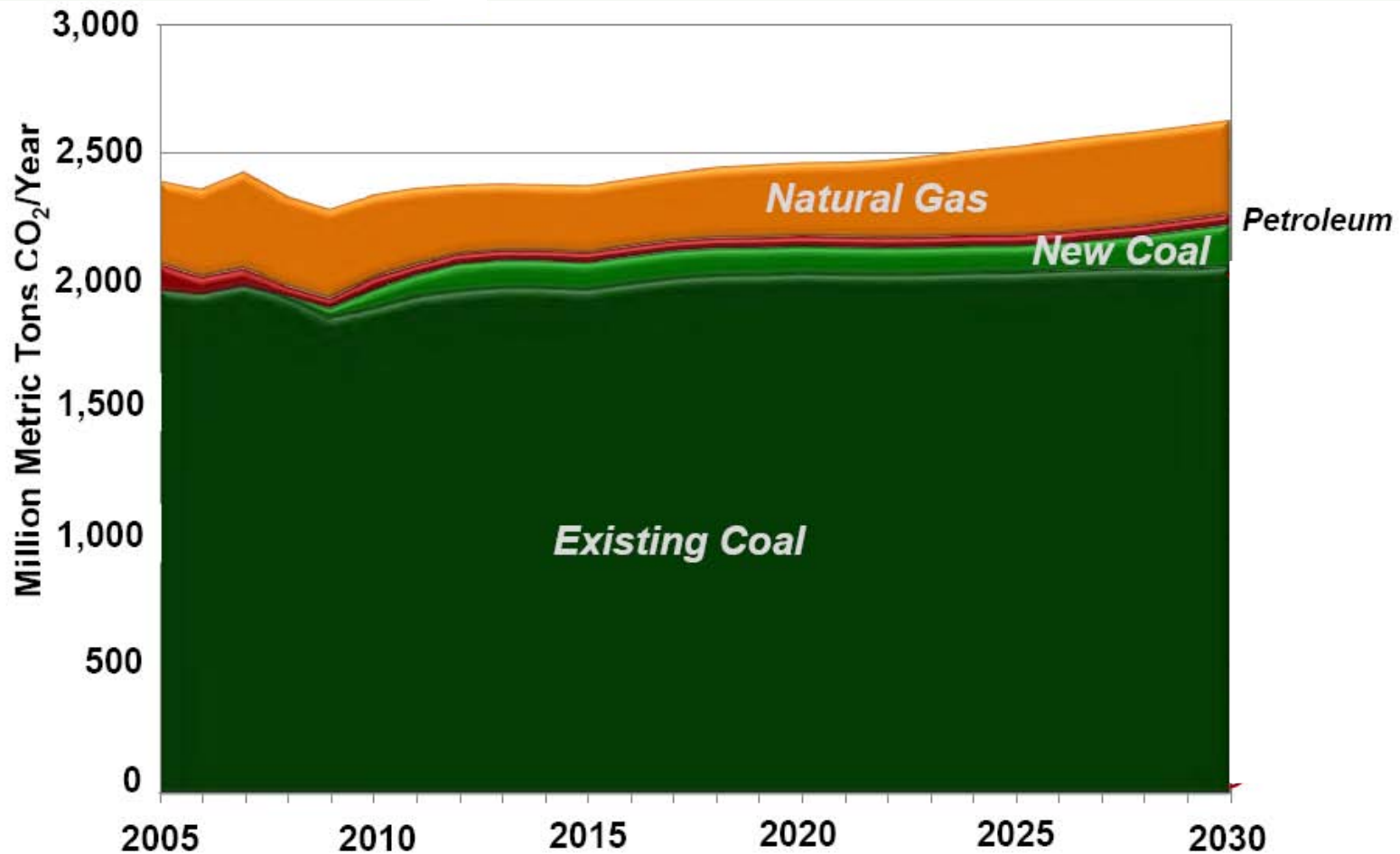
Roughly 50% of U.S. electricity is generated by coal

Energy in quadrillion BTUs (Quads)



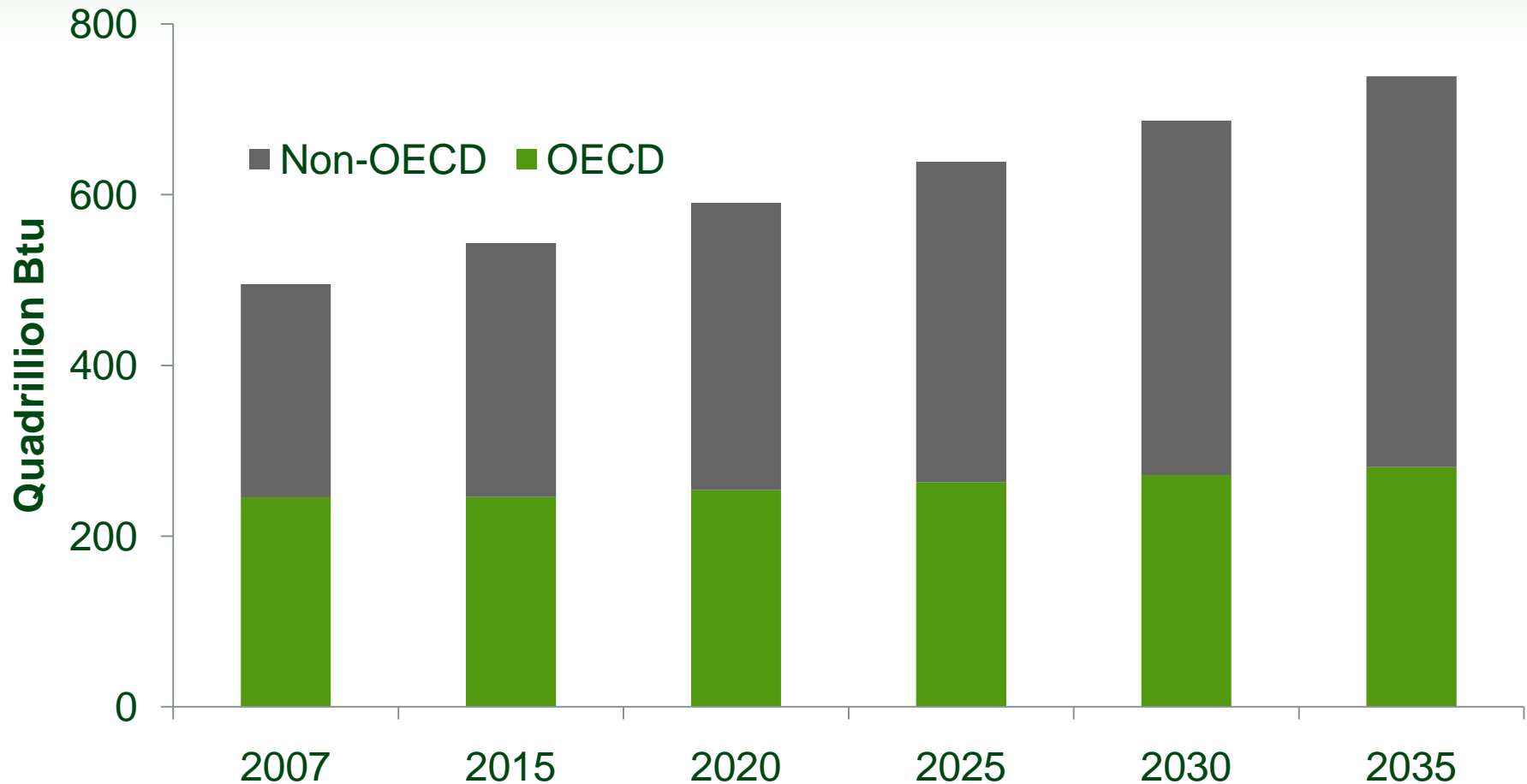
Source: LLNL Energy Flow Charts (2009)

U.S. coal-fired power plants emit ~ 2 billion tons of CO₂ annually



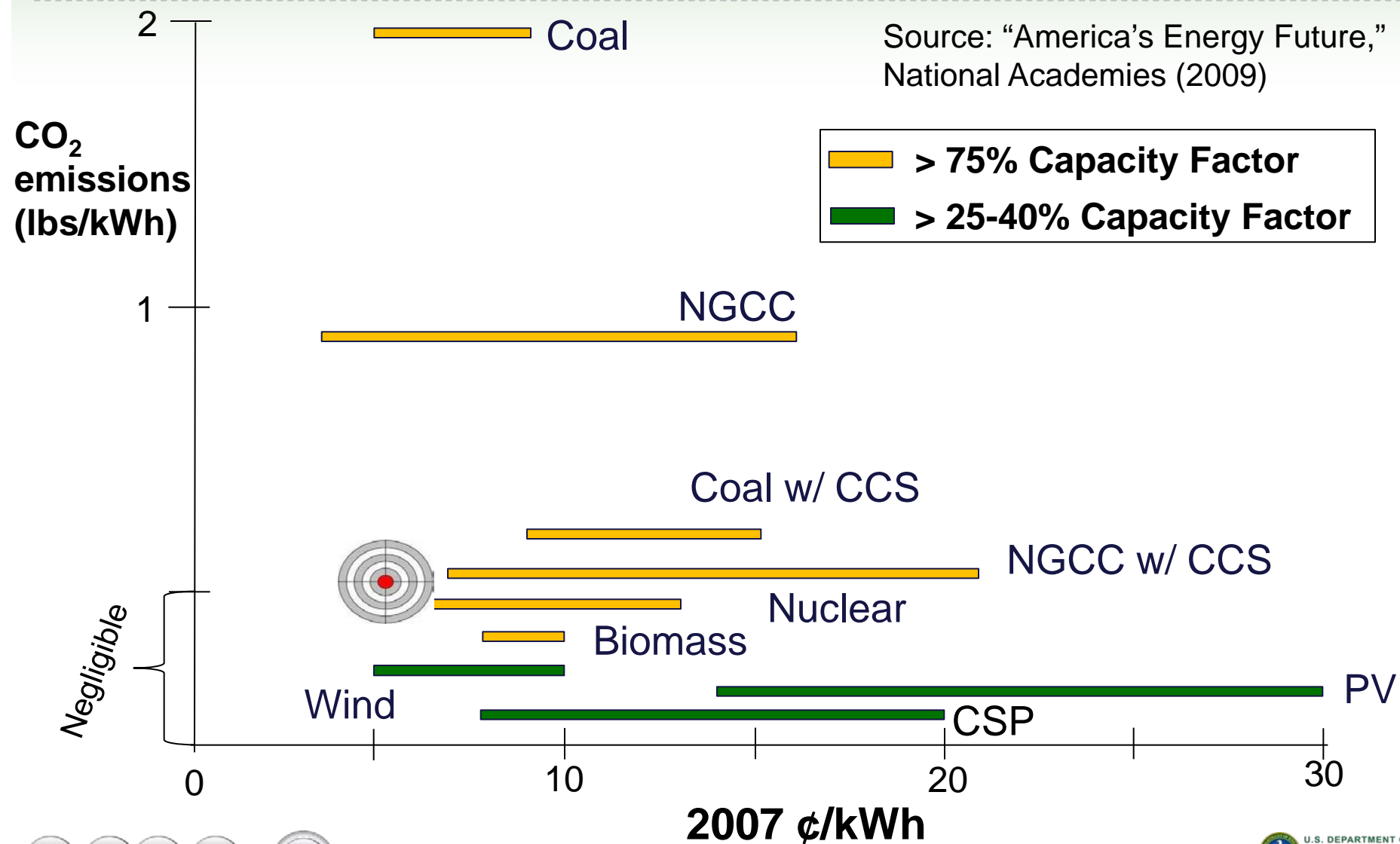
Source: Ciferno, NETL Existing Plants Program

World energy consumption: 49% growth by 2035

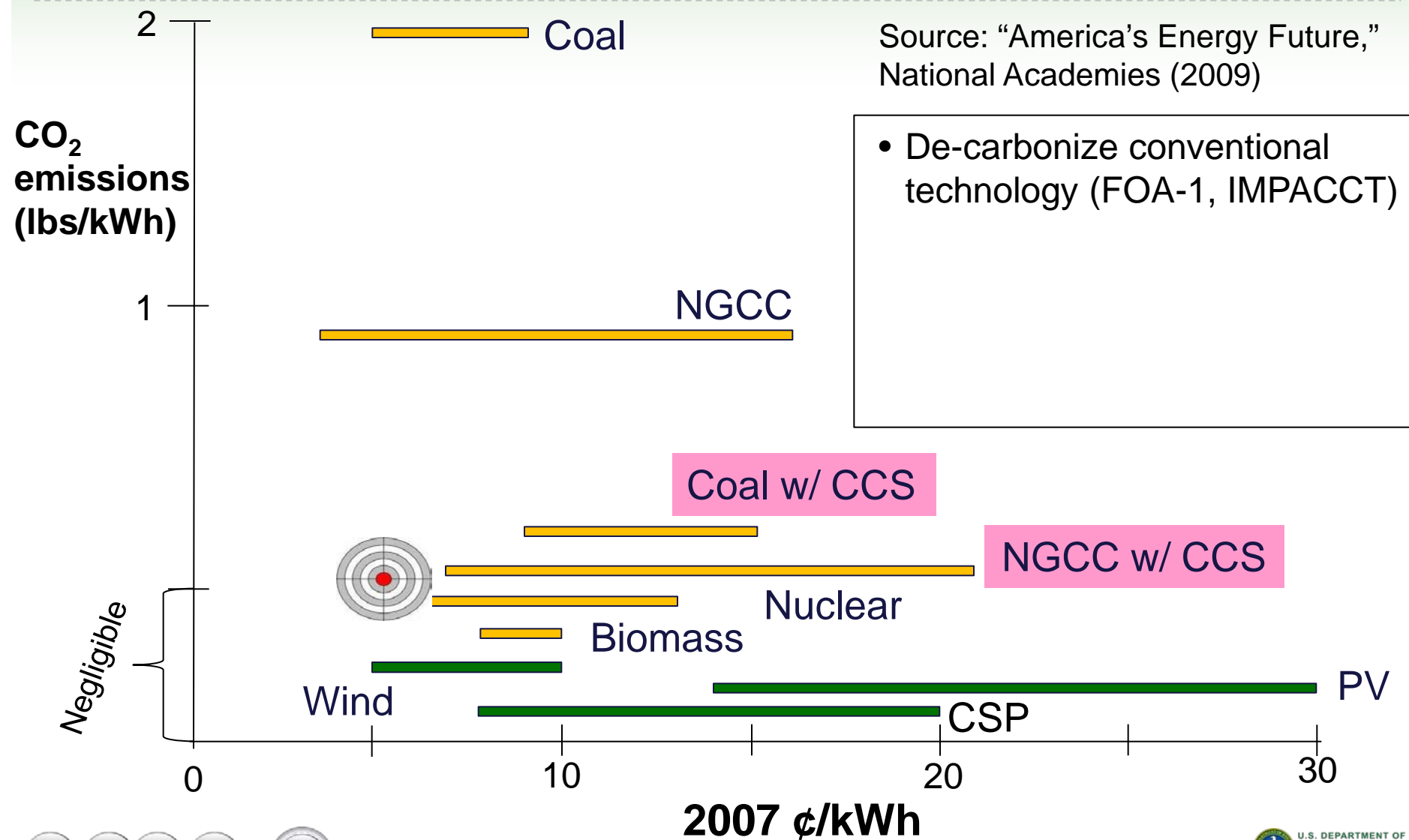


Source: DOE EIA

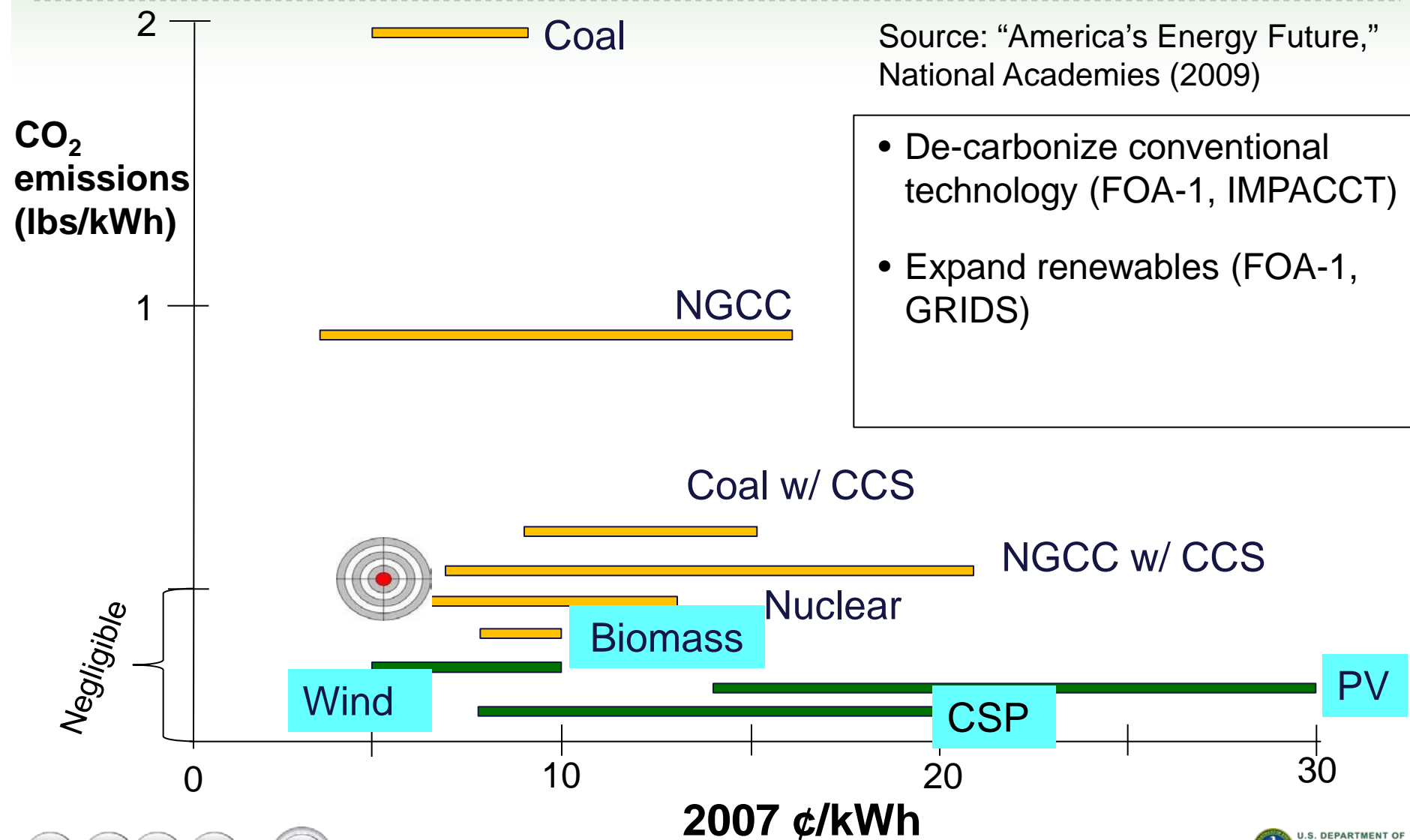
Goal: carbon-neutral at low cost



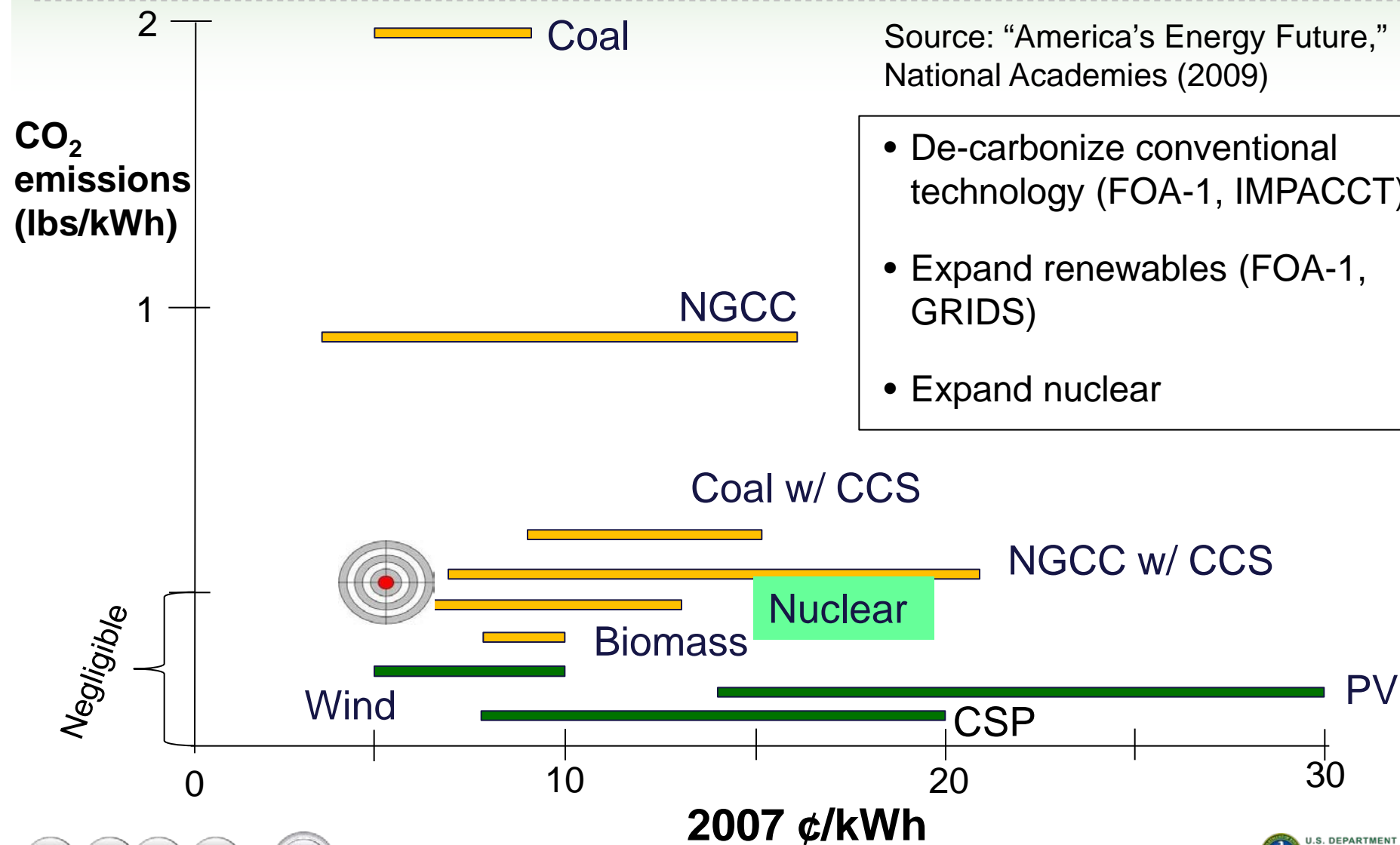
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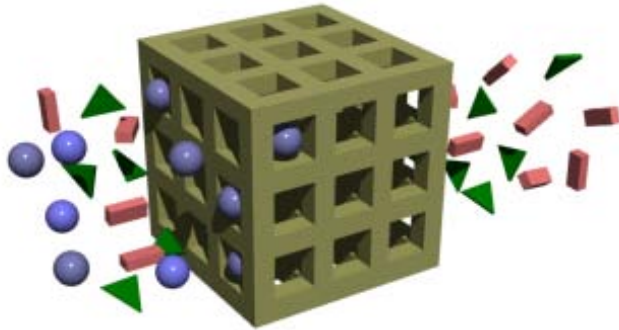


Source: "America's Energy Future,"
National Academies (2009)

- De-carbonize conventional technology (FOA-1, IMPACCT)
- Expand renewables (FOA-1, GRIDS)
- Expand nuclear

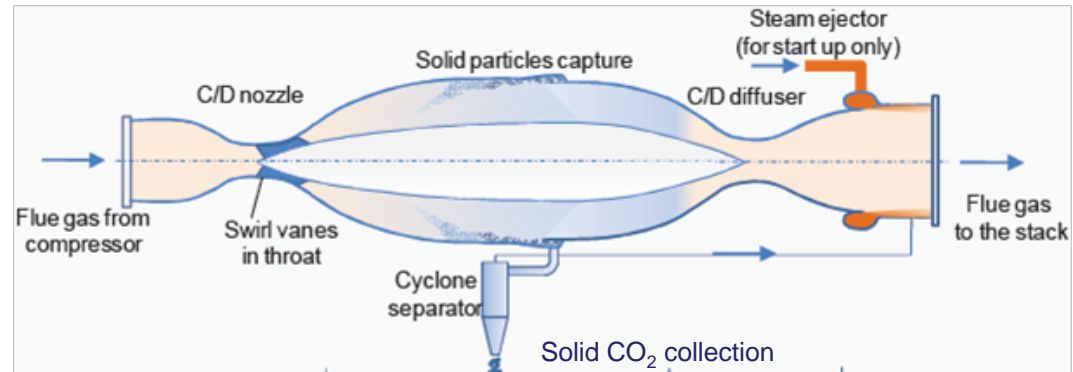
Innovative Materials & Processes for Advanced Carbon Capture Technology (IMPACCT)

Advanced materials



(LBNL)

New capture processes

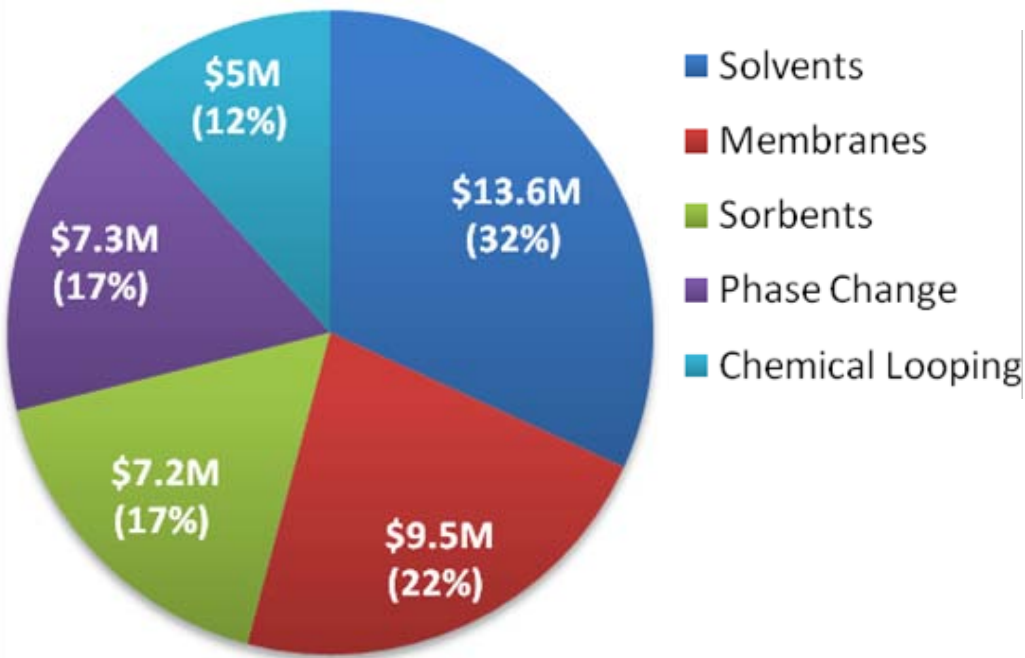


(ATK)

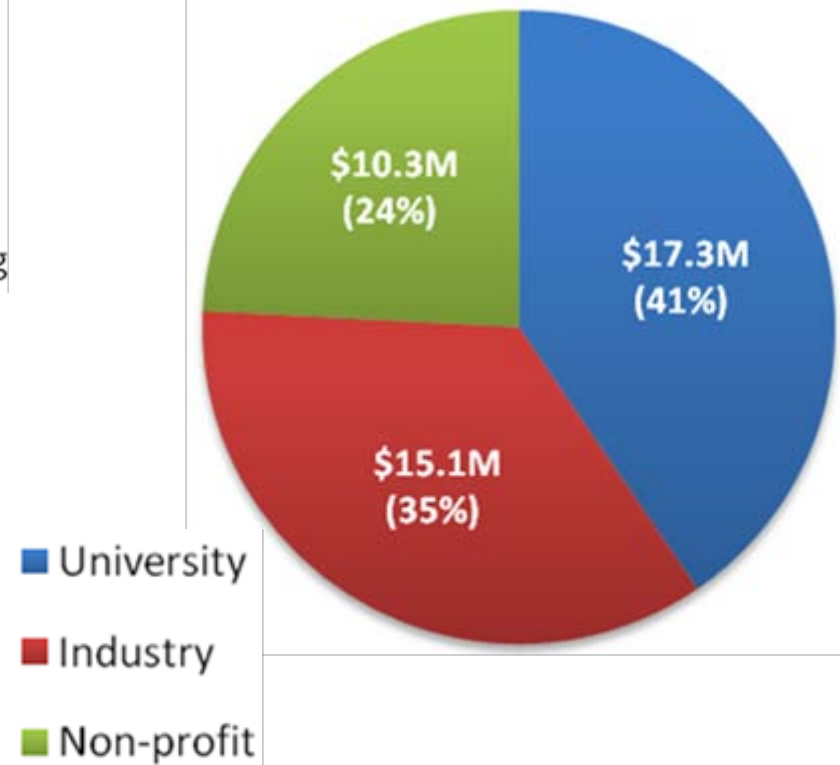
- Focus on most-expensive part of CCS: capturing CO₂
- High risk, high reward projects
- Complements existing DOE programs, filling a gap between Basic Energy Sciences and National Energy Technology Laboratory

Carbon capture projects from FOA-1 and IMPACCT: \$42.7M in funding

Funding by category

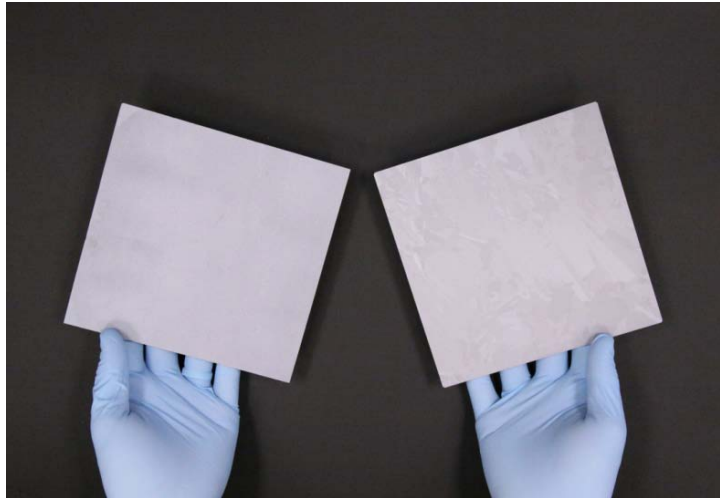


Funding by entity type



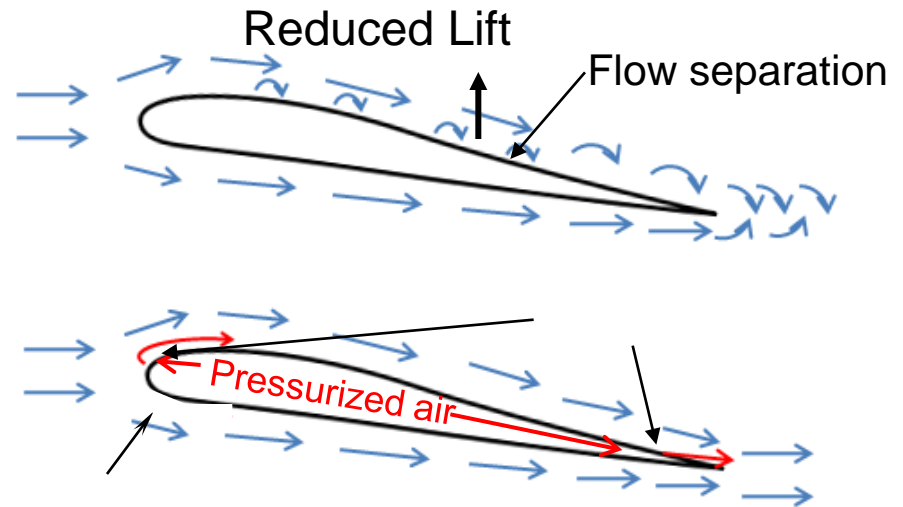
ARPA-E is also pursuing renewables for clean stationary power

Solar: 1366



“Monocrystalline-equivalent” silicon wafers directly from molten silicon to halve costs

Wind: Caitin



“Blown wings” already shown in DoD applications; less costly and more responsive to wind conditions